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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,377	03/31/2004	Hardayal Singh Gill	HIT1P083/HSJ920040042US1	8269

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ZILKA-KOTAB, PC
P.O. BOX 721120
SAN JOSE, CA 95172-1120

EXAMINER	
RENNER, CRAIG A	

ART UNIT	PAPER NUMBER
2627	

DATE MAILED: 09/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/815,377	GILL, HARDAYAL SINGH	
	Examiner	Art Unit	
	Craig A. Renner	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *2,6,7,12 and 19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,8-10 and 13-16* is/are rejected.

7)☐ Claim(s) *11,17 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *31 March 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of "group (I)," corresponding to claims 1-18, and "species II," upon which applicant identifies claims 1-11 and 13-19, in the reply filed on 25 August 2006 is acknowledged. Claim 19, however, will be withdrawn since it corresponds to non-elected group II. Additionally, claims 6 and 7 do not read on the elected species as elected Species II of FIGS. 4-5 has a tri-magnetic-layer pinned structure as opposed to a "single" magnetic layer pinned structure. The "single" magnetic layer pinned structure is taught with respect to non-elected Species I of FIG. 3, for instance. Also, claim 2 does not read on the elected species as elected Species II of FIGS. 4-5 does not include "wherein said pinned layer is pinned by a combination of magnetostriction of the pinned layer and compressive stress within the sensor." This is taught with respect to non-elected Species I of FIG. 3, for instance. Accordingly, claims 2, 6, 7, 12 and 19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim.

Drawings

2. The drawings were received on 31 March 2004. These drawings are accepted.

Specification

3. The abstract of the disclosure is objected to because it is not "within the range of 50 to 150 words." Appropriate correction is required. See MPEP § 608.01(b).

4. The disclosure is objected to because of the following informalities:

a. In lines 7-8 on page 18, "a first and second magnetic free layers" should be connected to read --first and second magnetic free layers--.

b. In line 2 of claim 10, "comrpsis" should be spelled --comprise--.

c. In lines 1-2 of claim 17, "three ferromagnetic layer" should be connected to read --three ferromagnetic layers--.

d. In line 1 of claim 18, "mangetoresistive" should be spelled --magnetoresistive--.

e. In lines 1-2 of claim 18, "from on another" should be connected to read --from one another--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Gill (US 2002/0135946).

Gill (US 2002/0135946) teaches a magnetoresistive sensor comprising first and second magnetically free layers (226 and 230, respectively, for instance); a magnetically pinned layer (206/204/208) sandwiched between the first and second free layers (as shown in FIG. 9, for instance), the magnetically pinned layer being self pinned (as shown in FIG. 9, for instance, i.e., tri-layer 206/204/208 is shown to be self pinned); a first electrically insulating barrier layer (214) sandwiched between the first magnetically free layer and the pinned layer (as shown in FIG. 9, for instance); and a second electrically insulating barrier layer (216) sandwiched between the second free layer and the pinned layer (as shown in FIG. 9, for instance) [as per claim 1]; wherein the barrier layers comprise aluminum oxide (as shown in FIG. 9, for instance, i.e., "Al_2O_3" is aluminum oxide) [as per claim 13].

7. Claims 1, 3-4, 8-9, and 13-16 are rejected under 35 U.S.C. 102(a) and/or 35 U.S.C. 102(e) as being anticipated by Inomata et al. (US 6,611,405).

Inomata et al. (US 6,611,405) teaches a magnetoresistive sensor (40) comprising first and second magnetically free layers (41 and 49, respectively); a magnetically pinned layer (43/44/45/46/47) sandwiched between the first and second free layers (as shown in FIG. 4, for instance), the magnetically pinned layer being self pinned (as shown in FIG. 4, for instance); a first electrically insulating barrier layer (42) sandwiched between the first magnetically free layer and the pinned layer (as shown in FIG. 4, for instance); and a second electrically insulating barrier layer (48) sandwiched between the second free layer and the pinned layer (as shown in FIG. 4, for instance) [as per claim 1]; wherein the pinned layer comprises Co and Fe, wherein the atomic percent of Fe is about 50% (line 61 in column 12 thru line 14 in column 13, for instance, i.e., "Co_xFe_{1-x}" where x=0.5) [as per claim 3]; wherein the pinned layer comprises CoFe with an atomic percent of Fe ranging from 20 to 60 percent (line 61 in column 12 thru line 14 in column 13, for instance, i.e., "Co_xFe_{1-x} ... where $0.5 \leq x < 1.0$" includes values within the claimed range) [as per claim 4]; wherein the pinned layer comprises three ferromagnetic layers (43, 45 and 47) separated by first and second non-magnetic coupling layers (44 and 46) [as per claim 8]; wherein the three ferromagnetic layers comprise Co and Fe and wherein the atomic percent of Fe in each layer is 20 to 60 percent (line 61 in column 12 thru line 14 in column 13, for instance, i.e., "Co_xFe_{1-x} ... where $0.5 \leq x < 1.0$" includes values within the claimed range) [as per claim 9]; wherein the barrier layers comprise aluminum oxide (lines 1-3 in column 10, for instance, i.e., "Al_2O_3" is aluminum oxide) [as per claim 13]; wherein the barrier layers comprise magnesium oxide (lines 1-3 in column 10, for instance, i.e., "MgO" is magnesium oxide)

[as per claim 14]; wherein at least one of the free layers comprises CoFe (lines 52-54 in column 7, for instance) [as per claim 15]; wherein at least one of the free layers comprises a layer of CoFe and a layer of NiFe, the CoFe layer being disposed closer to the pinned layer than the NiFe layer (lines 52-57 in column 7, for instance) [as per claim 16].

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inomata et al. (US 6,611,405).

Inomata et al. (US 6,611,405) teaches the magnetoresistive sensor as detailed in paragraph 7, supra. Inomata et al. (US 6,611,405), however, remains silent as to the pinned layer material comprising "CoFeV, with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent."

Official notice is taken of the fact that CoFeV, with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent, is a notoriously old and well known pinned layer material in that art. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to

have had the pinned layer material of Inomata et al. (US 6,611,405) comprise CoFeV, with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have had the pinned layer material of Inomata et al. (US 6,611,405) comprise CoFeV, with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent, since such is a notoriously old and well known pinned layer material in that art, and since selecting a known material on the basis of its suitability for the intended use is within the level of ordinary skill in the art, *In re Leshin*, 125 USPQ 416 (CCPA 1960).

Pertinent Prior Art

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This includes Ishikawa et al. (US 6,243,288), which teaches a magnetoresistive sensor (FIG. 1B, for instance) comprising first and second magnetically free layers (35 and 45, respectively); a magnetically pinned layer (51/52/53/52/54) sandwiched between the first and second free layers (as shown in FIG. 1B, for instance), the magnetically pinned layer being self pinned (as shown in FIG. 1B, for instance); a first spacer layer (lower-most 40) sandwiched between the first magnetically free layer and the pinned layer (as shown in FIG. 1B, for instance); and a second spacer layer (upper-most 40) sandwiched between the second free layer and the pinned layer (as shown in FIG. 1B, for instance).

Allowable Subject Matter

11. Claims 11, 17 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Monday-Tuesday & Thursday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Craig A. Renner
Primary Examiner
Art Unit 2627

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